

# Changes in Consumers' Knowledge of Food Guide Recommendations, 1990-91 Versus 1994-95

Joanne F. Guthrie<sup>1</sup>  
Food and Drug Administration

Brenda Derby  
Food and Drug Administration

Food guides are nutrition education tools that are used to translate scientifically based dietary standards, such as the Recommended Dietary Allowances (6) and the *Dietary Guidelines for Americans* (15), into terms that can be more easily understood and acted on by the general public (2). For example, a consumer may wish to consume the recommended amount of calcium. By providing a group of foods that the consumer recognizes as good sources of calcium (e.g., the Milk, Yogurt, and Cheese Group) and recommendations for the appropriate amount of food to consume from that group, food guides offer that consumer a set of guiding principles for selecting a nutritious diet.

The first food guide was developed in 1916. The U.S. Department of Agriculture (USDA), in particular, has been a leader in its development (16) and has continued to publish updated food guides that conform to advances in nutrition knowledge and changes in dietary recommendations. The current USDA Food Guide was developed in the mid-1980's to provide practical advice to Americans on food choices that meet the Dietary Guidelines (3,17) and was featured in several USDA publications (17) and the 1990 and 1995 editions of

the *Dietary Guidelines for Americans* (14,15). It gained further prominence with the publication in 1992 of the Food Guide Pyramid, a graphic representation of the major principles of the Food Guide (17). Details about the development of the Food Guide (3,17) and Pyramid graphic (17) are documented elsewhere.

The Pyramid graphic has appeared on a wide range of nutrition education and food marketing materials and has achieved a high level of consumer recognition in a short period. In the 1994 and 1995 Health and Diet Surveys, consumers were asked if they had heard of the Food Guide Pyramid: awareness rose from 33 percent in 1994 to 43 percent in 1995, a significant difference at the 95-percent confidence level. Also, by 1995, the Food Guide Pyramid was recognized by name by more consumers than either the Dietary Guidelines for Americans or the National Cancer Institute's 5 A Day program (9). Data from the American Dietetic Association's 1995 Nutrition Trends Survey has shown an even higher level of awareness: overall, 58 percent of consumers were aware of the Food Guide Pyramid, and among those, 48 percent said they were "somewhat" or "very familiar" with the Food Guide Pyramid (1).

---

<sup>1</sup>Formerly with the Center for Nutrition Policy and Promotion, U.S. Department of Agriculture, where this work was begun.

---

Although these results indicate a high level of general awareness of the Food Guide Pyramid, we believe it is also important to assess people's awareness of specific food group recommendations. This knowledge is necessary if people are to follow—successfully—a diet that conforms to Food Guide Pyramid recommendations. The purpose of this paper, therefore, is to assess people's awareness of specific food group recommendations of the Food Guide Pyramid between 1990-91 and 1994-95. USDA's Diet and Health Knowledge Survey (DHKS) is used.

## Methods

### Data Source

The DHKS collects information on diet-related knowledge, attitudes, and practices of Americans. Begun in 1989 as a telephone follow-up to USDA's 1989-91 Continuing Survey of Food Intakes by Individuals, the DHKS sampled individuals who said they were the main-meal planners for their households. The sampling procedure for the second cycle of the DHKS (1994) was changed to include adults 20 years of age and older, whether or not a meal planner. The household meal planner, however, is still identified, allowing for comparison among knowledge, attitudes, and practices of meal planners in the two periods. In both periods, the DHKS oversampled low-income respondents.

This study used all respondents to the 1994-95 DHKS ( $n=3,845$ ) to assess knowledge of food guide recommendations at that time. To examine changes in knowledge of food guide recommendations over time, we used the subset

of 1994-95 DHKS respondents who said they were the main-meal planner ( $n=2,407$ ), and we compared them to the meal planners from the 1990-91 DHKS ( $n=3,693$ ).<sup>2</sup> For both the 1989-91 and the 1994-95 DHKS, USDA provides survey weights that adjust for different rates of sample selection and nonresponse to match the sample to known population characteristics. These survey weights have been applied to all results presented here. This allows us to present findings that are more broadly generalizable. Additional details on the methods for each survey are reported elsewhere (11,12,13).

### Measures of Knowledge of Food Guide Recommendations

A set of questions assessing knowledge of food guide recommendations was not introduced in the DHKS until 1990. The questions in the 1991 survey were the same as those in the earlier DHKS. In 1994-95, however, there were some changes in the way questions were asked (table). Differences in the wording may influence responses; hence, this limitation of the study must be kept in mind.

At each period, respondents told the interviewers the number of servings they consumed rather than chose a number of servings from a set of choices offered by the interviewer. For each of the five major food groups, a range of recommended servings appears on the Food Guide Pyramid graphic (e.g., 2 to 4 servings of fruit and 3 to 5 servings of vegetables). The recommended number

of servings for a given person varies, depending on caloric and nutrient needs (17). For this study, any answer within a range based on these needs was accepted as correct; we believed it was unreasonable to expect people to know their precise recommendation within the range. Answers below that range were coded as "lower than recommended," and answers above that range were coded as "higher than recommended." For each question, relatively small percentages of respondents did not give an answer; their responses were treated as missing values for that specific question.

### Statistical Analysis

To assess knowledge of USDA Food Guide recommendations in 1994-95 (cross-sectional analysis), we estimated the percentage of adults who believed they should consume the recommended number of servings. All adult respondents who provided valid number of servings were included in the analysis. We used weighted estimates to generalize the results to American adults 20 years old and over.

To examine changes in knowledge of food guide recommendations over time (trends analysis), we compared the percentage of meal planners in 1994-95 who believed they should consume the recommended number of servings with the percentage of meal planners in 1990-91 who provided similar responses. We used weighted estimates to generalize the results to meal planners in American households.

---

<sup>2</sup>Questions on food guide recommendations were not included in the 1989 DHKS.

## Comparison of knowledge of food guide recommendations among main-meal planners, 1990-91 and 1994-95<sup>1</sup>

### Question 1990-91:

Let's begin by talking about your opinion of the amount of food, such as fruits, vegetables, and meats that people should eat each day for good health. How many servings of [Food Group] should a person eat daily if one serving equals [amount]?

### Question 1994:

Let's begin by talking about the number of servings from different food groups that a person should eat each day. How many servings from the [Food Group] would you say a person of your age and sex should eat each day for good health?

Food Group (amount)	Percent of main-meal planners providing response corresponding to Food Guide Pyramid recommendations	
	1990-91	1994-95
Fruit Group <sup>2</sup> Fruit....[1 piece of whole fruit] <sup>3</sup>	71	74
Vegetable Group <sup>2</sup> Vegetables....[a half cup of cooked vegetables)] <sup>3</sup>	33	55
Milk, Yogurt & Cheese Group <sup>2</sup> Dairy Products....[1 cup of milk or a slice of cheese] <sup>3</sup>	60	59
Bread, Cereal, Rice & Pasta Group <sup>2</sup> Grain Products....[1 slice of bread or a half cup of cooked cereal, rice, or pasta] <sup>3</sup>	2	8
Meat, Poultry, Fish, Dry Beans, Eggs, and Nuts Group <sup>2</sup> Meat, Poultry, or Fish....[a piece the size of a medium hamburger] <sup>3</sup>	53	60

<sup>1</sup>Diet and Health Knowledge Survey.

<sup>2</sup>Phrasing used in 1994; example serving amount not given in 1994.

<sup>3</sup>Phrasing used in 1990-91; example serving amounts given are shown in brackets.

## Results

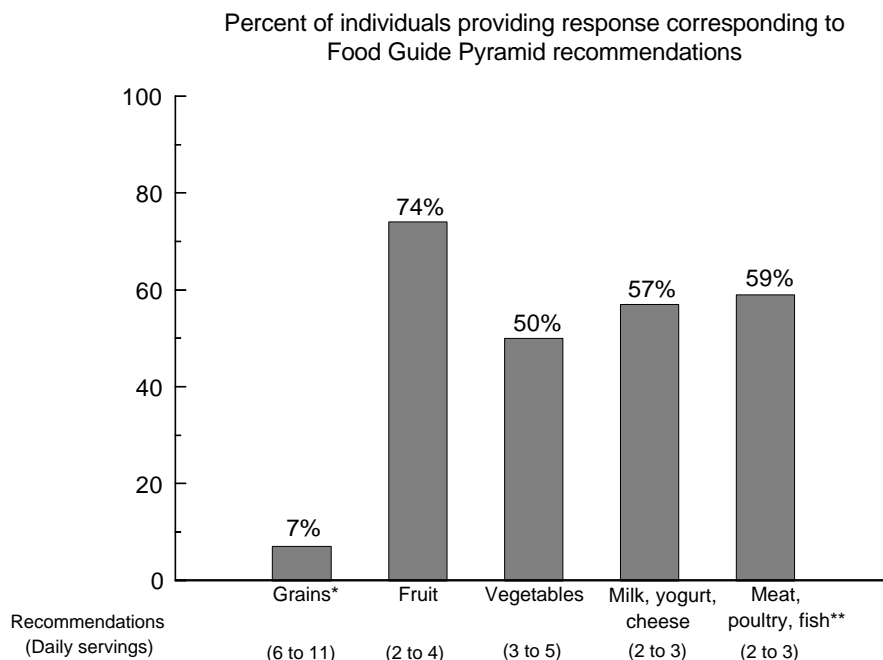
In 1994-95, the percentage of adults who believed they needed to consume a number of servings daily from each of the five major food groups that corresponds to Food Guide Pyramid recommendations varied considerably among food groups (fig. 1). The range went from 74 percent of the consumers who reported the correct recommendation for the Fruit Group to 7 percent for the

Bread, Cereal, Grains, and Pasta Group. One-half to about three-fifths of adults gave an answer that was within the correct range for the Vegetable Group; Milk, Yogurt, and Cheese Group; and Meat, Poultry, Fish, Dry Beans, Eggs, and Nuts Group.

The table compares knowledge of the recommendations between 1990-91 and 1994-95 for main-meal planners only. This is a period of particular interest—

the USDA released the Food Guide Pyramid graphic in 1992. The 1994-95 estimates in the table differ slightly from those in figure 1: the table includes data from main-meal planners only; figure 1 includes data from all adults. Except for the Milk, Yogurt, and Cheese Group, main-meal planners' knowledge of recommendations for the major food groups appears to have increased between the two periods. The difference for the Vegetable Group

**Figure 1. Knowledge of Food Guide Pyramid recommendations among adults, 1994-95<sup>1</sup>**



**Our findings indicate that for four of the five food groups at least 50 percent of adults believe they should consume the number of servings recommended by the Food Guide Pyramid.**

<sup>1</sup>Diet and Health Knowledge Survey.

\*Bread, cereal, grains, and pasta.

\*\*Meat, poultry, fish, dry beans, eggs, and nuts.

is particularly striking—from 33 to 55 percent.

Generally, those who did not know the recommendations gave answers that were below the amounts recommended by the USDA Food Guide. There were two exceptions: For the Milk, Yogurt, and Cheese Group (in 1990-91 and 1994-95), 13 to 15 percent of meal planners believed they should consume more servings than are recommended by the Food Guide (fig. 2). For the Fruit Group, in 1994, 12 percent believed they consumed more than the recommendations (fig. 3).

## Discussion and Conclusions

Our findings indicate that for four of the five food groups at least 50 percent of adults believe they should consume the number of servings recommended by the Food Guide Pyramid. The exception is the Bread, Cereal, Grains, and Pasta Group. Previous research indicates that knowledge of serving recommendations is associated with intakes of food groups that more closely match recommendations (7). Thus, increasing people's knowledge of food group serving recommendations is one strategy for improving diet quality.

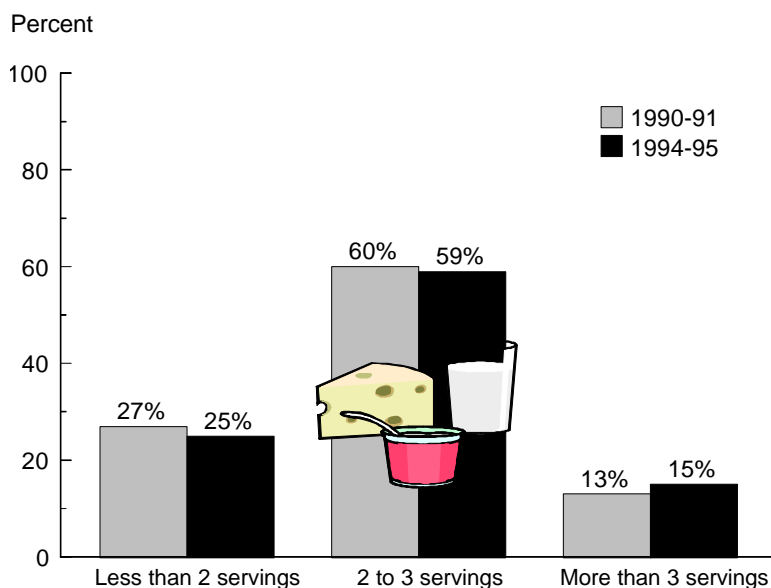
Trend data indicate what knowledge of serving recommendations was acquired between 1990-91 and 1994-95. Unfortunately, only trends in main-meal planners' knowledge could be examined—they were the primary sample in the 1990-91 DHKS. Despite this limitation, we believe the information may still be useful, because meal planners are frequently the focus of nutrition education efforts. Also, the change in the wording of the question may have affected some of the change in results between 1990-91 and 1994-95. Given these limitations, it appears that main-meal planners' knowledge of food group recommendations increased across the period studied, but the increase was not uniform.

Knowledge of vegetable recommendations increased considerably. Not only did knowledge of fruit recommendations increase, but some respondents in 1994-95 also believed they should consume even more servings of fruit than the Food Guide Pyramid recommends. Although knowledge of recommended servings from the Bread, Cereal, Grains, and Pasta Group increased, it still remained at a level far below that of other groups.

The difference in knowledge of recommendations regarding each of the major food groups raises a question. How are consumers getting and using knowledge of Food Guide Pyramid recommendations? Results tell us what consumers believe but do not tell us how they came to hold those beliefs. More research examining how consumers learn specific recommendations would be useful to designers of nutrition intervention programs.

The role of public education efforts in disseminating specific information should be considered. Recommendations for some food groups have been publicized

**Figure 2. Beliefs concerning intake of milk, yogurt, and cheese group among main-meal planners, 1990-91 and 1994-95<sup>1</sup>**



Number of servings main-meal planners believe they should consume daily<sup>2</sup>

<sup>1</sup>Diet and Health Knowledge Survey.

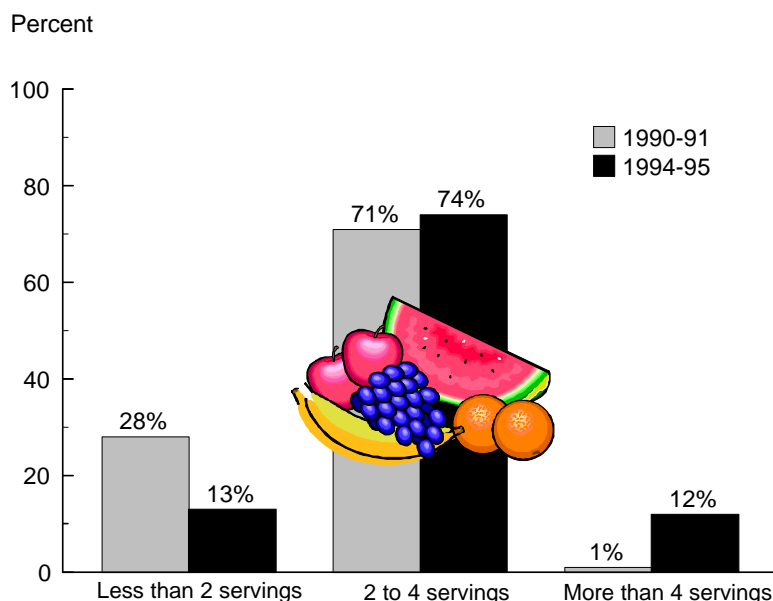
<sup>2</sup>One percent of main-meal planners responded "don't know."

widely. For example, recommendations for fruit and vegetable consumption have been highly publicized as a part of the 5 A Day Campaign (5). This may be a factor in what seems to be an increasing belief that fruit and vegetables should be consumed in larger amounts. Fruit and vegetables have been identified as being among the most underconsumed food groups by Americans (8). Hence, increasing consumers' knowledge of fruit and vegetable recommendations can be highly beneficial in improving the diets of Americans.

It is unfortunate that knowledge of recommended consumption of grains, another food group reported to be widely underconsumed (8), continues to be at such low levels. One reason may be the

lack of a broad-based promotion program, such as 5 A Day. Another problem may be consumers' confusion about the meaning of the recommendation. Shaw et al. (10) have noted that for most food groups, the food guide serving amount is similar to the size of a portion typically consumed by most people. (For example, the Food Guide Pyramid serving is  $\frac{1}{2}$  cup of cooked vegetables or 1 cup of raw leafy greens. This corresponds well to the size of a typical portion.) For grains, however, the typical portion is about twice that of a Food Guide Pyramid serving. (For example, a typical portion is 1 cup of rice or pasta or 1 whole hamburger bun.) Thus, one reason consumers may have difficulty learning or accepting this recommendation may be confusion

**Figure 3. Beliefs concerning fruit intake among main-meal planners, 1990-91 and 1994-95<sup>1</sup>**



**Results tell us what consumers believe but do not tell us how they came to hold those beliefs.**

Number of servings main-meal planners believe they should consume daily<sup>2</sup>

<sup>1</sup>Diet and Health Knowledge Survey.

<sup>2</sup>One percent of main-meal planners responded "don't know."

about serving amounts. Further examination of the 1994-95 DHKS indicates that 43 percent of consumers believe they should eat 3 to 5 servings of grains daily. (Data are not shown.) If their portions are twice that of the food guide serving, consumers' intake would match the recommendations of 6 to 11 servings.

Confusion over serving amount may be part of the problem; however, 1994-95 DHKS data also indicate that almost 50 percent of consumers believe they need fewer than 3 servings of grains daily. (Data are not shown.) It appears that many consumers are not convinced of a health need for grains; perhaps they do not have a clear understanding of the

health value of grains. Perhaps they hold conflicting beliefs. For example, according to a recent survey by the Wheat Food Council and American Bakers Association (18), 40 percent of consumers think bread is fattening, and 35 percent think starches should be avoided. Given the 1995 Dietary Guidelines Advisory Committee's urging that Americans learn to make grains the center of their plate (4), researchers need to continue investigating why people do not recognize the role of grains in the diet. Other nutrition professionals need to promote strategies that increase consumers' knowledge of the recommended servings of the Food Guide Pyramid—especially those for the Bread, Cereal, Grains, and Pasta Group.

---

## References

1. American Dietetic Association. 1995. *1995 Nutrition Trends Survey: Executive Summary*. American Dietetic Association, Chicago, IL.
2. Axelson, M.L. and Brinberg, D. 1989. *A Social-Psychological Perspective on Food-Related Behavior*. Springer-Verlag, New York, NY.
3. Cronin, F.J., Shaw, A., Krebs-Smith, S.M., Marsland, P., and Light, L. 1987. Developing a food guidance system to implement the Dietary Guidelines. *Journal of Nutrition Education* 19:281-302.
4. Dietary Guidelines Advisory Committee. 1995. *Report of the Dietary Guidelines Advisory Committee on the Dietary Guidelines for Americans, 1995*. U.S. Department of Agriculture, Agricultural Research Service.
5. Eisner, E., Loughrey, K., Sutton, S., Johnston, C., and Doner, L. 1992. *5 A Day for Better Health Messages: Reaching and Educating the American Public*. Office of Cancer Communications, National Cancer Institute. Unpublished report.
6. Food and Nutrition Board. 1989. *Recommended Dietary Allowances*. (10<sup>th</sup> ed.). National Academy of Sciences, Washington, DC.
7. Guthrie, J.F. and Fulton, L.H. 1995. Relationship of knowledge of food group servings recommendations to food group consumption. *Family Economics and Nutrition Review* 8(4):2-17.
8. Kennedy, E.T., Ohls, J., Carlson, S., and Fleming, K. 1995. The Healthy Eating Index: Design and applications. *Journal of the American Dietetic Association* 95:1103-1108.
9. Levy, A.S. and Derby, B.M. 1995. *Food Label Use and Nutrition Education Survey: Selected Results Prepared for the Dietary Guidelines Advisory Committee*. Paper prepared for the Dietary Guidelines Advisory Committee, Washington, DC ( March).
10. Shaw, A., Fulton, L., Davis, C., and Hogbin, M. 1996. *Using the Food Guide Pyramid: A Resource for Nutrition Educators*. U.S. Department of Agriculture, Center for Nutrition Policy and Promotion.
11. U.S. Department of Agriculture. 1994. 1989-91 Continuing Survey of Food Intakes by Individuals and Diet and Health Knowledge Survey, data and methodology. CD-Rom.
12. U.S. Department of Agriculture. 1996. 1994 Continuing Survey of Food Intakes by Individuals and Diet and Health Knowledge Survey, data and methodology. CD-Rom.
13. U.S. Department of Agriculture. 1996. 1995 Continuing Survey of Food Intakes by Individuals and Diet and Health Knowledge Survey, data and methodology. CD-Rom.
14. U.S. Department of Agriculture and U.S. Department of Health and Human Services. 1990. *Nutrition and Your Health: Dietary Guidelines for Americans*. (3<sup>rd</sup> ed.). U.S. Department of Agriculture. Home and Garden Bulletin No. 232.
15. U.S. Department of Agriculture and U.S. Department of Health and Human Services. 1995. *Nutrition and Your Health: Dietary Guidelines for Americans*. (4<sup>th</sup> ed.). U.S. Department of Agriculture. Home and Garden Bulletin No. 232.
16. Welsh, S., Davis, C., and Shaw, A. 1992. A brief history of food guides in the United States. *Nutrition Today*, November/December, pp. 6-11.
17. Welsh, S., Davis, C., and Shaw, A. 1993. *USDA's Food Guide: Background and Development*. Miscellaneous Publication No. 1514. U.S. Department of Agriculture, Human Nutrition Information Service.
18. Wheat Food Council and American Bakers Association. 1995. *What America Thinks About Eating Right: A Gallup Opinion Survey*.